

Locality: Midway stage on McConnico plantation, Wilcox Co., Alabama.

Remarks: This specimen is quite imperfect, but the species is so well marked that it deserves a name. It is probably the same form mentioned by Prof. Harris in Bulletin of Am. Pal., No. 4, p. 232.

SCALA DOLOSA n. sp. Pl. 1, fig. 13.

Shell rather small, cancellated; whorls eight, the first two smooth, balance with spiral lines which are coarse near the middle of each whorl, these lines give each whorl an angulated profile. The spirals are nodular in part at the intersections with the longitudinals. The figured specimen shows a varix; aperture nearly circular, outer lip expanded and rounded, interior smooth. Umbilicus open, and carrying a groove. Base of shell carrying numerous spirals, but no nodes, the lines of growth being very fine. Length 7 mm., breadth 4 mm.

Locality: Near Grave Yard Hill, Wilcox Co., Ala. Midway Stage.

FISSURELLA UNILINEATUS n. sp. Pl. 1, fig. 10.

Shell small, rather thin, depressed conic, cancellated. The radial lines are equal and regularly spaced, while the longitudinals are bowed between the radials, giving to the surface a wavy appearance, no nodules at the intersections, the lines crossing regularly. Hole oval, with a complete oval callus inside. Longest diam. 13 mm., breadth about 7 mm., height 3 mm.

Locality: Wood's Bluff, Ala.

NOTES.

ASHMUNELLA. On page 134 of the last number, the second line from bottom should read *ASHMUNELLA RHYSSA HYPORHYSSA* Ckll., in place of "*Ashmunella rhyssa* (Ckll.)." Owing to my absence in Florida I had no opportunity to see the proofs of this article.

H. A. P.

THE ORIGIN OF THE LUNG IN AMPULLARIA.

BY W. K. BROOKS.¹

Through the courtesy of Dr. Alfred G. Mayer I was able to visit and partially explore the Everglades of Florida in March, 1906. As we pushed our way through the tall reeds and grasses that cover the

¹ From the Report of the Department of Marine Biology, Tortugas, Florida. Extracted from the Fifth Year-Book of the Carnegie Institution of Washington, p. 109, 1907,

shallow water of the Everglades, we found great numbers of small eggs attached to the stems of the reeds and grasses above the surface of the water but close to it.

The eggs were arranged in vertical rows, and were enclosed in calcareous shells, resembling in these respects the eggs of terrestrial pulmonate gasteropods.

We also found in the water in great abundance the prosobranchiate gasteropod *Ampullaria*, and when some of the older eggs were opened they were found to contain young specimens of this genus.

The *Paludinidæ*, which are closely related to the *Ampullaridæ*, are aquatic, viviparous, and breathe by gills, and their structure indicates that they are true prosobranchs, descended from and closely related to the marine prosobranchs. *Ampullaria* has gills, is partly aquatic, and seems to be a true prosobranch, so far as its general structure is in question, but as it has a lung, and is able to breathe air and live out of the water, and as it also lays, in the air, eggs in calcareous shells, like those of the terrestrial pulmonates, the question whether it is primarily a pulmonate, with secondary resemblance to the prosobranchs or primarily a prosobranch with secondary resemblance to the pulmonates, suggests itself.

As the embryonic history of the breathing organs may be expected to throw light upon this question, a quantity of the eggs were collected and taken to the Marine Laboratory in the Dry Tortugas. There the eggs were opened, the embryos removed and sketched, and then hardened and preserved for embryological examination.

On my return to Baltimore I placed the material in the hands of Mr. B. McGlone, who has studied the development of the respiratory organs under my supervision, and has nearly completed his work, which will soon be ready for publication. He has shown that the lung of *Ampullaria* is a member of the series of gill-filaments, and that it must be regarded as a modified gill, homologous with a ctenidium, or with more than one. It is therefore an organ which has been secondarily acquired, and not derived from the lung of the terrestrial pulmonates.

Both lung and gills arise very early in the embryonic history of *Ampullaria*, and at about the same time. In a very young embryo, soon after the mantle makes its appearance, a ridge or thickening of the epithelium of the inner surface of the mantle indicates the region from which the gill-filaments, the lung and the osphradium are to arise. The osphradium is developed from one end of this ridge, the gill-filaments from the other, and between the two the ridge becomes infolded into the substance of the mantle to give rise to the lung, which may be regarded as a modified and invaginated gill-filament.

The similarity between the lung of the pulmonates and that of *Ampullaria* is therefore nothing more than a new illustration of a resemblance between organs that have been acquired independently under like physiological conditions.